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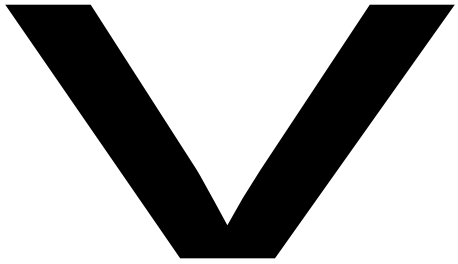
Matrox MXO

Installation and User Guide

July 18, 2011



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Matrox Electronic Systems Ltd.
1055 St. Regis Blvd., Dorval, Quebec, Canada H9P 2T4
Tel: (514) 685-2630 Fax: (514) 685-2853 World Wide Web: www.matrox.com

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1

Introducing Matrox MXO

This chapter outlines the features of Matrox MXO, describes the MXO operation modes, lists the contents of your kit, provides the MXO system requirements, and describes the available MXO documentation.

Welcome to Matrox MXO

Matrox MXO connects to your Mac computer or laptop to provide broadcast-quality audio/video output. You can view your Apple Final Cut Pro projects or the output of many other QuickTime-based applications without interlacing artifacts, and record them to tape at the same time. You can also use Matrox MXO to provide flicker-free recording of Keynote and PowerPoint presentations, web browser sessions, and software application training.

Matrox MXO key features

The following are key features of Matrox MXO:

- Inexpensive HD monitoring.
- DVI monitor calibration through the Matrox DVI Calibration Utility.
- Genlock timing offset controls let you align your video output relative to your external genlock source to compensate for cable delays within your system.
- Frame-accurate broadcast-quality audio/video output in HD and SD.
- Portable, hot-swappable external box.
- Genlockable HD/SD SDI, HD/SD analog component, S-Video, and composite video outputs.
- Up to eight channels of embedded SDI audio output with stereo audio monitoring.
- Workflow enhancements for Final Cut Pro and other QuickTime-based applications such as:
  - Frame-accurate audio/video output for insert editing and printing to tape with guaranteed audio/video synchronization.
  - Interlacing artifact elimination and gamma correction when previewing video on a secondary DVI display.
  - Hardware-accelerated output of DVCPRO HD, HDV, and Final Cut Pro Dynamic RT segments to full output resolution to save processing power for other applications.
  - Realtime downconverting of HD projects to SD with proper color space conversions.
- Flicker-free, broadcast-quality video output of your computer desktop with any application.

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Matrox MXO operation modes

Matrox MXO works in two different modes depending on your application:

- **Mastering mode** This mode is for video editors using QuickTime-based applications such as Final Cut Pro. Matrox MXO uses the DVI port on your Mac computer in a unique way to output frame-accurate audio/video for insert editing and printing to tape. Up to eight channels of mono audio are available from your application and embedded in the SDI output signal. The MXO preferences window allows you to choose which stereo pair you would like to monitor via MXO's RCA output. To use Matrox MXO in Mastering mode, you must first select MXO as the output device for your application. For more information on how to do this, see "Specifying your video and audio output device settings" on page 34.
- **Presentation mode** This mode mirrors the contents of your MXO desktop (secondary display) and outputs it as high-quality video, such as for display on a video monitor or recording to a VTR. In Presentation mode, MXO can be used as an SD and HD scan converter to display and record Keynote and PowerPoint presentations or web browser sessions. It can also be used to create software application training. When working in Presentation mode, your system's audio playback is routed to all the MXO audio outputs.

Supported video output standards

Matrox MXO supports the following video output standards:

- NTSC
- PAL
- 1080i (1920×1080i) at 25 and 29.97 frames per second (fps)
- 1080PsF (1920 × 1080PsF) at 23.98 fps
- 720p (1280 × 720p) at 50 and 59.94 fps

Note Up to and including version 6, Final Cut Pro does not support 720p at 50 fps as an output format.

When working in Mastering mode, you can choose to downconvert your HD video output to SD, such as to output a 720p at 23.98 fps project as NTSC. The following table shows the supported MXO video output standards depending on your project's video playback setting:

Video playback	Video output
NTSC	NTSC
PAL	PAL
720p at 23.98 fps	720p at 59.94 fps or NTSC

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Video playback	Video output
720p at 25 fps	720p at 50 fps or PAL
720p at 29.97 fps	720p at 59.94 fps or NTSC
720p at 50 fps	720p at 50 fps or PAL
720p at 59.94 fps	720p at 59.94 fps or NTSC
1080p at 23.98 fps	1080PsF at 23.98 fps
1080p at 23.98 fps (at 29.97 fps)	1080PsF at 29.97 fps or NTSC
1080p at 25 fps	1080PsF at 25 fps or PAL
1080p at 29.97 fps	1080PsF at 29.97 fps or NTSC
1080i at 25 fps	1080i at 25 fps or PAL
1080i at 29.97 fps	1080i at 29.97 fps or NTSC

Hardware supplied for Matrox MXO

- Matrox MXO box.
- Matrox MXO cable (includes USB, DVI, and audio connectors).
- Y/C (S-Video) adapter cable.
- External AC/DC adapter and power cord.

Matrox MXO system requirements

Matrox MXO requires a Mac system with the following system configuration:

- Mac OS X Lion v10.7.
- Free USB port.
- Display card with a secondary DVI-I or Mini DisplayPort connector. Must be able to display 1920×1200 at 60 Hz. A Mini DisplayPort to DVI adapter is required for Mini DisplayPort display cards.

Note You must have a secondary DVI-I or Mini DisplayPort connector for use with Matrox MXO, and connect your primary DVI monitor to a different connector on your display card. If you're using an AGP-type display card, it must run at a speed of 4x or faster.

- DVI monitor that supports a native display resolution of 1920×1200 is recommended, such as the 23-inch Apple Cinema Display.

Supported programs

- Apple Final Cut Pro v7.0.3.
- Adobe After Effects v10.5.

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Check our website for equipment information

For up-to-date information about recommended computer systems and other MXO-compatible devices such as display cards and DVI monitors, check the Matrox Video Support site at www.matrox.com/video/support.

About this manual

This manual provides you with information about installing and using your Matrox MXO hardware and software, including how to configure your Matrox MXO for use with Final Cut Pro and Adobe After Effects.

Style conventions

The following style conventions are used in this manual:

- The names of files, folders, and manuals appear in *italics*. For example:
  - The data is stored in the *Sample Movie* file.
  - The file is located in the *Clips* folder.
  - Please refer to your *Final Cut Pro User's Manual*.
- Menus and commands that you need to choose are displayed in the form **Menu > Command**. For example, **File > Save** means click **File** in the menu bar, then click **Save** in the menu that appears.

Last-minute information

Any important information that wasn't available for inclusion in this manual by publication time is provided to you in the *Matrox MXO Release Notes*.

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Your notes

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2

Connecting External Devices to Matrox MXO

This chapter shows you how to connect external devices to Matrox MXO.

MXO connections

Matrox MXO allows you to connect multiple devices for simultaneous output. The connections you make depend on which video formats you wish to output.

Important Only DVI monitors that accept digital input are supported for use as a secondary display with Matrox MXO. In order to preview full-resolution HDV video, your DVI monitor must support a display resolution of at least 1920×1080.

Available MXO connections

- One DVI input.
- One DVI output.
- One USB 2.0 port.
- Your choice of one of the following video output combinations:
  - HD SDI output with embedded audio and simultaneous HD analog component output.
  - SD SDI output with embedded audio and simultaneous SD analog component output.
  - SD SDI output with embedded audio and simultaneous S-Video and composite output.
- Genlock reference input.
- One RCA stereo output.
- DC power jack.
- One male stereo audio input and one female stereo audio output.

Connecting your MXO to your Mac system

The Matrox MXO kit includes a cable to connect the MXO box to your Mac system. The cable has four connectors on the system end, and two connectors to attach to the MXO box.

To connect the MXO to your Mac system:

0. Connect the USB B connector on the MXO end (two connectors) of the cable to the USB B port on your MXO.
1. Connect the DVI connector on the MXO end of the cable to the DVI IN port on the MXO. Tighten the thumb screws to ensure a stable connection.
2. Connect the DVI connector on the system end of the cable (four connectors) to the secondary DVI port on your Mac system. Tighten the thumb screws to ensure a stable connection.

Note A Mini DisplayPort to DVI adapter is required when connecting MXO to a Mini DisplayPort display card.

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3 Connect the USB A connector on the system end of the cable to the USB A port on your Mac system.

Remarks

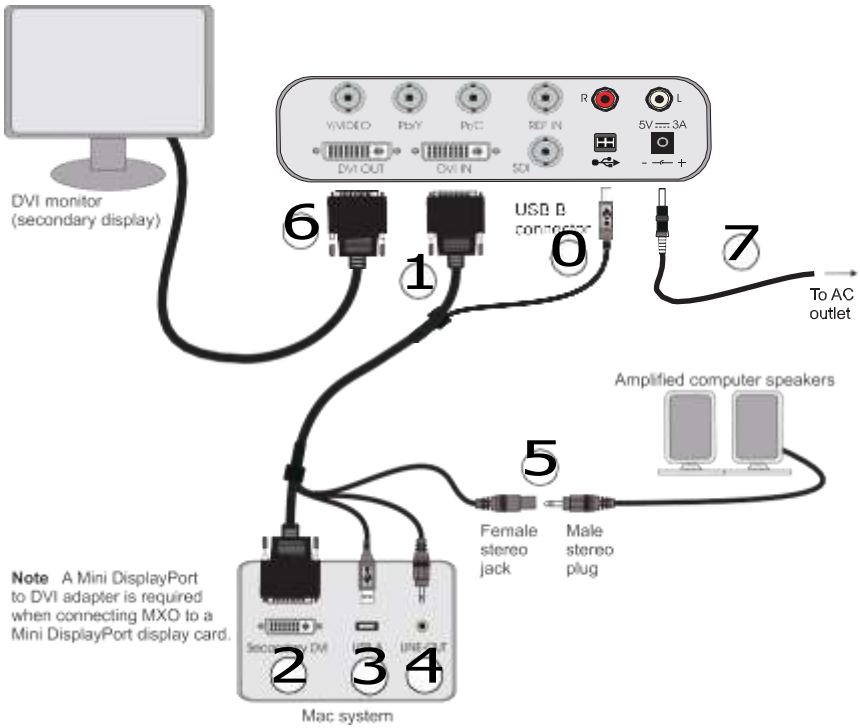
- The MXO requires a High-Speed USB 2.0 connection. **Do not** plug the USB cable connector to the USB socket on your keyboard.
- If you disconnect the USB cable at any time or shut your system down, the MXO will automatically shut off.

4 Insert the male stereo audio plug on the system end of the MXO cable into the LINE OUT jack on your sound card or laptop.

5 Connect the female stereo audio jack on the system end of the MXO cable to your speakers.

6 Connect the DVI connector on your Apple Cinema Display (secondary display) to the DVI OUT port on the MXO.

7 Connect the external power supply to the DC power jack on the MXO, and to an AC outlet. If your MXO comes with an external power supply cable with international adapter plugs for use in different regions, see "MXO power supply and adapter plugs" on page 10.



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MXO power supply and adapter plugs

If your MXO kit includes an external power supply cable with international adapter plugs for use in different regions, the following instructions detail how to remove and insert the adapter plugs:

- To remove an adapter plug from the power adapter, hold down the button labeled **PUSH** on the power adapter, and then slide the adapter plug up until it releases from the power adapter.
- To insert an adapter plug into the power adapter, ensure that the adapter plug is properly aligned with the corresponding slot on the power adapter, and then slide the adapter plug down into the power adapter until it locks into place.

Removing an adapter plug

Inserting an adapter plug

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About the Matrox MXO secondary display

When Matrox MXO is connected to your Mac system (see "MXO power supply and adapter plugs" on page 10), the Mac operating system sees the MXO as a secondary monitor. Since MXO doesn't have a screen, a DVI monitor (secondary display) must be connected to the DVI OUT connector on your MXO to view what will be output through MXO's video outputs. This display has different functions depending on the MXO operation mode as described in "Matrox MXO operation modes" on page 3.

- **Mastering mode** When in Mastering mode, MXO turns the secondary display into an SD or HD video monitor that gives you an accurate, broadcast-quality preview of your video when working with a QuickTime-based application, such as Final Cut Pro. The Matrox DVI Calibration Utility lets you calibrate your DVI monitor so that it performs like a traditional broadcast video monitor when working in Mastering mode (see Chapter 4, "Calibrating Your Secondary Display").
- **Presentation mode** When in Presentation mode, whatever is displayed on the secondary display's desktop is mirrored and output as high-quality video through the Matrox MXO video outputs.

Important If a secondary display is not connected to your MXO, do not drag the menu bar off your primary display in the **Arrangement** pane of the **Displays** window, as you will not be able to get the menu bar back.

Typical Matrox MXO connections

The following illustrations show some typical MXO connections. In these illustrations we've connected an Apple Cinema Display as the secondary display, and also connected a video device, such as a VTR or video monitor. We've connected the audio output from the MXO box to the video device, but you can connect it to a sound mixer if you are using one.

Note You can also connect an external sync generator to ensure proper equipment timing. However, this is optional as the MXO generates its own internal reference signal if an external genlock is not available.

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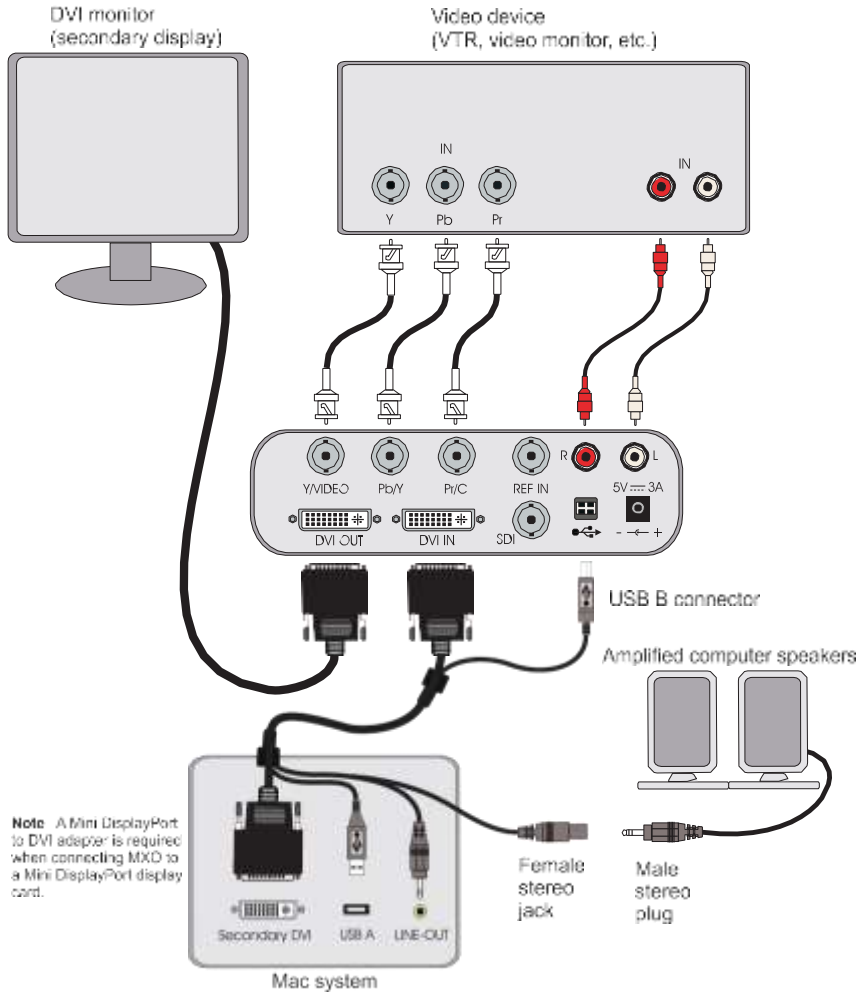
Analog component connections



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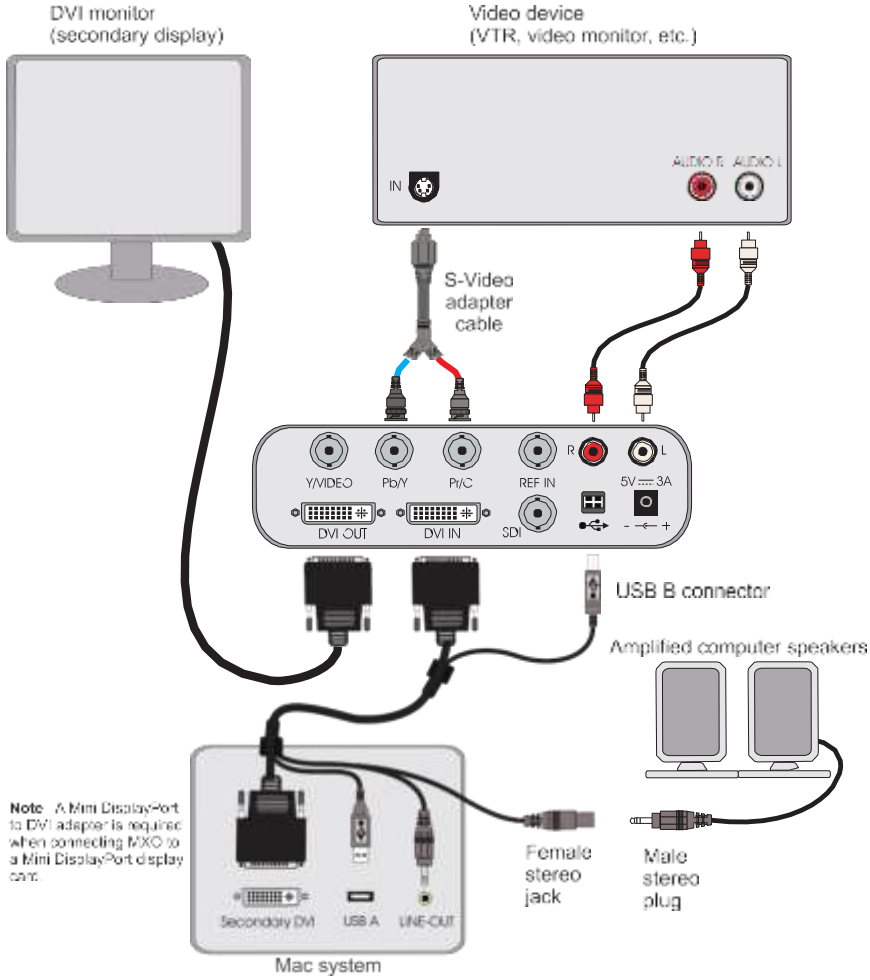
S-Video connections



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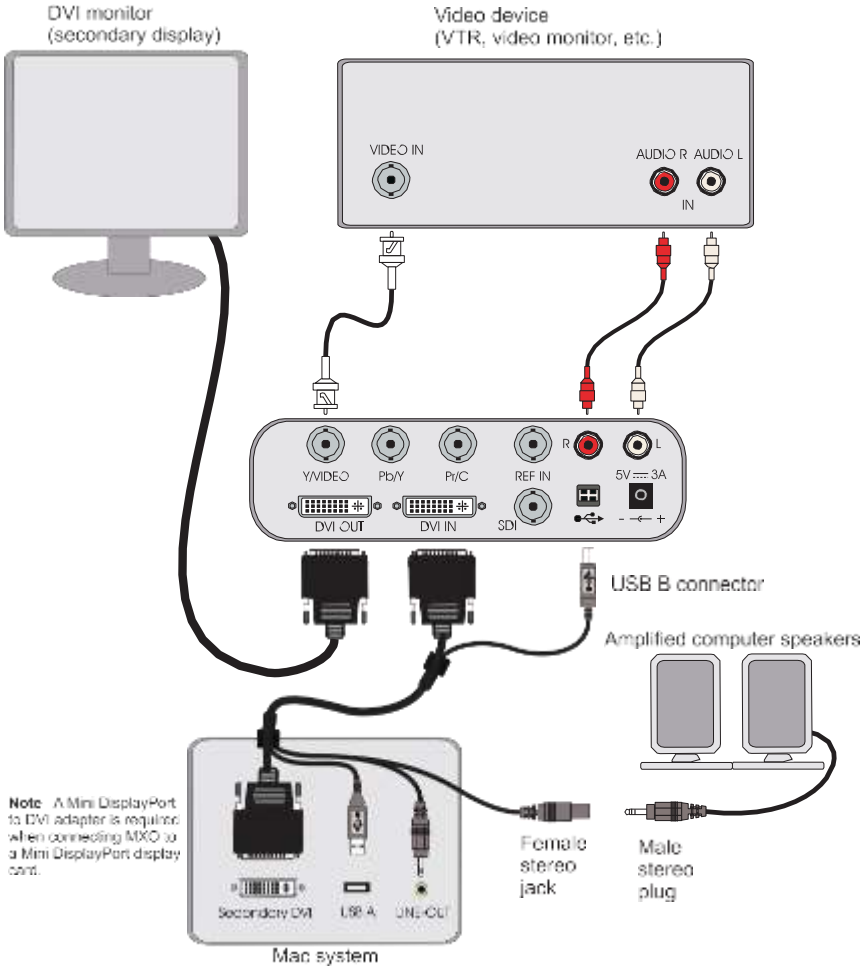
Composite connections



Typical Matrox MXO connections

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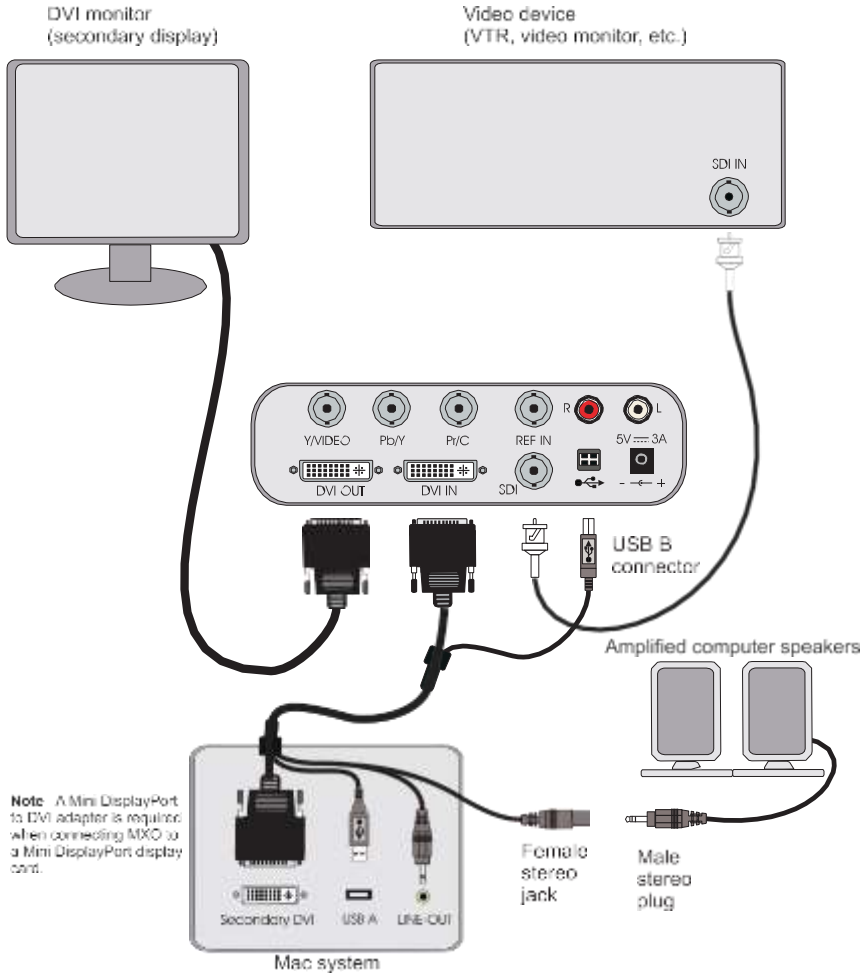
SDI connections



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3

Installing Your Matrox MXO Software and Configuring Your System

This chapter explains how to install the Matrox MXO software and how to configure your system in the Matrox MXO preferences window.

Installing your Matrox MXO software

If you plan on using MXO in Mastering mode for video editing, you should install Apple Final Cut Pro before installing the MXO software. To download and install the latest version of the MXO software, visit the MXO Support section of our website at www.matrox.com/video/support. You can also contact your MXO dealer for the latest software.

Removing your Matrox MXO software

1. In the **Finder** menu, choose **File > New Finder Window**.
2. Choose **Applications** > **Matrox MXO Utilities** > **MXO Uninstaller**.
3. Enter your administrator password in the **Authenticate** dialog box, then click **OK**.

Important The uninstall will not work unless you enter the correct administrator password.

Optimizing text in Presentation mode

If you're using MXO in Presentation mode, you may encounter color spill around text on your secondary display, and in the MXO video output. If this occurs, you may be able to resolve this issue by setting the font smoothing option in your Mac OS as follows:

1. From the **Apple** menu, click **System Preferences**, and then click the **Appearance** icon.
2. For Mac OS X Leopard systems, select **Standard - best for CRT** from the **Font smoothing style** menu. For Mac OS X Snow Leopard systems, select **Use LCD font smoothing when available**.
3. **Restart** your computer for the change to take affect.

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Defining your settings in the Matrox MXO preferences window

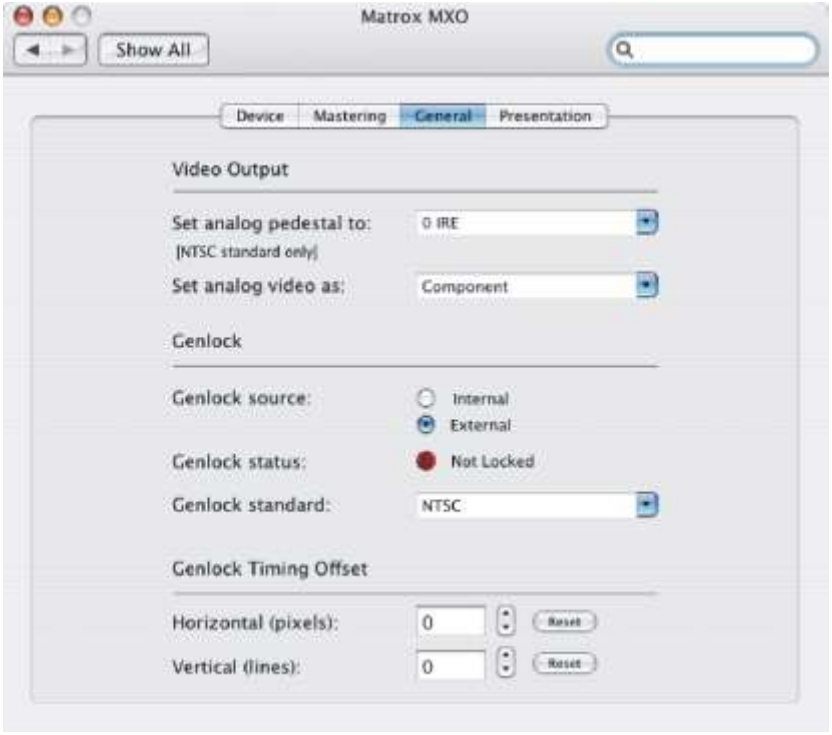
The Matrox MXO preferences window allows you to specify various settings to configure your video and audio output from MXO for the Mastering and Presentation modes. You can also use the Matrox MXO preferences window to view information about MXO, such as the serial number and current operating temperature.

Specifying your General settings

To specify your General settings on Matrox MXO:

1 From the **Apple** menu, click **System Preferences**, and then click the **Matrox MXO** icon.

2 Click **General**.



3 Under **Video Output**, select the setup level you want for your NTSC analog video from the **Set analog pedestal to** menu:

- **7.5 IRE** Applies the standard NTSC setup level of 7.5 IRE.
- **0 IRE** Applies a setup level of 0 IRE. You should select this option only when working with a commercial DV-1394 device that uses the Japanese

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analog NTSC setup of 0 IRE. For example, if the video appears too bright when you play back DV clips on your NTSC monitor, you can change the setup to 0 IRE to output your DV clips at the correct brightness.

Note This setting is applicable for NTSC video only. It has no effect when working with HD material.

4 Under **Video Output**, from the **Set analog video as** menu, select the type of analog video output you want by selecting **Component**, or **Composite & Y/C**.

5 Under **Genlock**, for **Genlock source** select one of the following:

- **Internal** Select this to genlock to MXO's internal reference signal. Select this option only if you don't have an external sync generator connected to the REF IN on your MXO.
- **External** Select this if you connected an external sync generator to the REF IN on your MXO.

The status of your genlock source will be displayed next to **Genlock status** as **Locked** or **Not Locked** to indicate whether or not Matrox MXO is presently locked to your genlock source.

6 From the **Genlock standard** menu, select your external genlock source's video standard.

Important To ensure good output results, make sure that your genlock source's video standard is compatible with the MXO video output standard.

7 Use the horizontal and vertical settings under **Genlock Timing Offset** to adjust the timing of the video output relative to your external genlock source. This lets you compensate for cable delays within your system.

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Specifying your Mastering mode settings

To specify your Mastering mode settings on Matrox MXO:

1. From the **Apple** menu, click **System Preferences**, and then click the **Matrox MXO** icon.
2. Click **Mastering**.

3. Under **Video Output**, select **Both fields**, **First field**, or **Second field** from the **Scrub and pause** menu to indicate whether you want to display both fields or only one field when you pause video playback or scrub the timeline in your project. For example, you may want to scrub the first or second field to eliminate the flickering that can be seen in your picture when you pause while scrubbing interlaced video.
4. Under **Video Output**, select **Downconvert HD video to SD** if you want to downconvert HD video output to SD.

Remarks

- When you select **Downconvert HD video to SD**, you do **not** need to change your video playback setting in Final Cut Pro. Your project's video playback setting must always match your sequence setting.
- If you're working with a 1080p at 23.98 fps project in Final Cut Pro (1080p24), selecting **Downconvert HD video to SD** will not be enough to successfully downconvert to SD because a pulldown process must be

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applied to the video. In order to downconvert your 1080p at 23.98 fps material to SD, select **Downconvert HD video to SD**, click **View > Video Playback** from the **Final Cut Pro** menu, and then choose the **1080p 23.98 (at 29.97)** format for the codec you are using.

5 If you select **Downconvert HD video to SD**, or if you are working with SD 16:9 material, you can select one of the following video output options from the **Output 16:9 material as** menu:

- **Letterbox** Outputs the widescreen 16:9 picture in letterbox mode by adding black bars at the top and bottom of the picture for display on a standard 4:3 television screen.
- **Anamorphic** Outputs the widescreen 16:9 picture as horizontally compressed 4:3 video, which retains the picture's full vertical resolution for display on a widescreen television. To display the video with the correct proportions on an NTSC or PAL monitor, select the 16:9 display setting on the monitor.
- **Center cut** Outputs the widescreen 16:9 picture by evenly cropping the left and right edges of the picture for display on a standard 4:3 television screen.

6 Under **Audio Output**, from the **Monitor audio on** menu, select which audio channel pair you want to monitor from the embedded SDI audio.

7 Under **DVI Monitor (Secondary Display)**, you can select options pertaining to your secondary display when working in Mastering mode:

- **Virtual bezel** Select this option to display a virtual bezel on a loaded clip on your secondary display. This option is useful in identifying the areas of your clip that would be hidden by a bezel when displayed on a standard television screen. For information on how to set the virtual bezel, see "Displaying a virtual bezel" on page 23.
- **Scale to fit** When this option is enabled, MXO scales your video to fit your secondary display's native resolution. Your video's aspect ratio is maintained when scaled. For example, on a secondary display with a native resolution of 1920 × 1200, your 1280 × 720p video is scaled to fit a resolution of 1920 × 1200.

  When this option is disabled, MXO displays the video on your secondary display at its true resolution (1:1 pixel ratio). If your video cannot be displayed at its true resolution on your secondary display, MXO scales your video to fit your secondary display's native resolution. For a table showing supported scaling settings for various DVI monitor resolutions, see Appendix A, "DVI Monitor Scaling Capabilities with Matrox MXO."
- **DVI monitor calibration** Select this option to output the adjusted DVI video using the loaded Matrox DVI calibration settings for your DVI monitor. Disable this option to output the DVI video without using the

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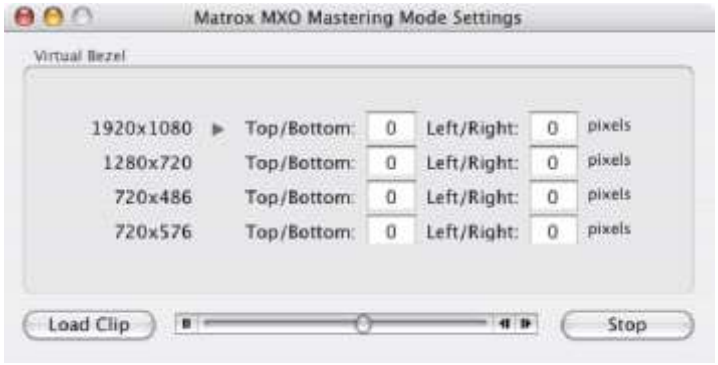
loaded Matrox DVI calibration settings. In this case, the DVI video is output from MXO with its native color settings.

To calibrate your DVI monitor or load Matrox DVI calibration settings, enable **DVI monitor calibration**, and then click the **Calibrate** button. For details on calibrating your DVI monitor and loading DVI calibration settings using the Matrox DVI Calibration Utility, see Chapter 4, "Calibrating Your Secondary Display."

Displaying a virtual bezel

Matrox MXO lets you superimpose a customizable bezel on a loaded clip on your secondary display. This feature is useful in identifying the areas of your clip that would be hidden by a bezel when displayed on a standard television screen. For example, you can simulate a safe title area to check the placement of titles.

1. From the **Apple** menu, click **System Preferences**, click the **Matrox MXO** icon, and then click **Mastering**.
2. Under **DVI Monitor (Secondary Display)**, select **Virtual bezel**, and then click the corresponding **Setup** button.



3. Click **Load Clip**, select a video clip, and then click **Open**.
4. An arrow appears beside the video resolution of the loaded clip. For this resolution, type a value in pixels for **Top/Bottom** and **Left/Right** to represent the thickness of the bezel that you want to display.
5. Click **Stop** to remove the clip from your secondary display, and return to the desktop.

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Specifying your Presentation mode settings

To specify your Presentation mode settings on Matrox MXO:

Important To avoid color spill around text when in Presentation mode, see "Optimizing text in Presentation mode" on page 18.

1. From the **Apple** menu, click **System Preferences**, and then click the **Matrox MXO** icon.
2. Click **Presentation**.

3. Under **Video Output**, from the **Output desktop as** menu, select the video standard in which you want the contents of your MXO desktop (secondary display) to be encoded and routed to the MXO video outputs, such as for display on a video monitor or recording to a VTR. If the resolution of your desktop is larger than the standard you select, MXO will scale the video output accordingly. If your desktop resolution is smaller, the video output will be centered. For best results, set the MXO desktop resolution so that it's close in size to your selected video output standard as follows:

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Video output standard	Desktop resolution
NTSC	640 × 480
PAL	800 × 600
720p	1280 × 720
1080i/PsF	1920 × 1080

Note If your secondary display's desktop is set to **640×480 (stretched)**, the video output will be black if you choose to output the desktop as HD video.

4 Select **Region of interest** to define a region on your secondary display's desktop that you want to output through MXO's video outputs. For information on how to set the region of interest, see "Defining a region of interest on your secondary display" on page 26.

5 The **Anti-flicker filter** option is enabled by default to prevent flickering when previewing interlaced video. You may want to clear this option when working with graphics files in Photoshop, or when displaying full-screen video with QuickTime Player.

6 Select **Scale to fit** if you want your secondary display's desktop to be scaled to fit the display's native resolution. The desktop's aspect ratio is maintained when scaled. For example, if your secondary display's native resolution is 1920×1200, and its desktop is set to 1280×720, selecting this option scales your secondary display's desktop to fit a resolution of 1920×1200.

When this option is disabled, your secondary display's desktop is centered and displayed at its set resolution (1:1 pixel ratio). For example, if the desktop is set to 1280×720, clearing this option displays the desktop at 1280×720, regardless of your secondary display's native resolution. For some monitors, if the desktop cannot be displayed at its set resolution, MXO will attempt to scale the desktop to fit your secondary display. The desktop's aspect ratio is maintained when scaled. If your secondary display's desktop cannot be scaled, the display will be black. For a table showing supported scaling settings for various DVI monitor resolutions, see Appendix A, "DVI Monitor Scaling Capabilities with Matrox MXO."

Important If your secondary display's desktop is black, the information on the desktop is not lost, and will still be available through MXO's video outputs. The only exception is if your secondary display's desktop is set to **640×480 (stretched)**, and you choose to output the desktop as HD video. In this case, the video output will be black.

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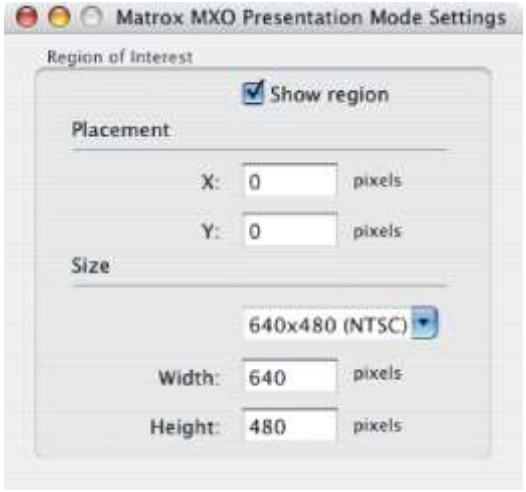
Defining a region of interest on your secondary display

Matrox MXO allows you to output a specific area of your secondary display's desktop, instead of the entire desktop.

1. From the **Apple** menu, click **System Preferences**, click the **Matrox MXO** icon, and then click **Presentation**.
2. Under **DVI Monitor (Secondary Display)**, select **Region of interest**, and then click the corresponding **Setup** button.



3. Select **Show region** to view the customizable region on your secondary display.
4. Under **Placement**, type a value for **X** and **Y** to set the position of the region (top-left corner) on your secondary display's desktop. A position of 0,0 places the region at the top-left corner of the desktop. You can also set the placement of the region by dragging its top-left corner.
5. Under **Size**, select either a preset size from the menu, or select **Custom** and type a value for **Width** and **Height** to set the region's size in pixels. You can also adjust the size of the region by dragging its bottom-right corner.

Note If you select a preset size that won't fit on the desktop because of the currently selected placement, the menu will switch to **Custom** and the region will be clipped to fit in the desktop. For example, if the region is located near the bottom-right corner of your secondary display's desktop, and you select **1920×1080**, the region will be clipped to fit in the desktop. To prevent this, set the placement of the region to 0,0 before selecting a preset size.

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Viewing MXO information

To view MXO information, such as the serial number and operating temperature:

1. From the **Apple** menu, click **System Preferences**, and then click the **Matrox MXO** icon.
2. Click **Device**.

3. To display the current MXO operating temperature, select **Monitor temperature**.

Important If your MXO exceeds the maximum operating temperature at any time, it will display a warning and automatically shut down to avoid damage. Should this occur, make sure your MXO is not close to a heat source and that the ventilation holes are not obstructed.

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4

Calibrating Your Secondary Display

This chapter explains how to use the Matrox DVI Calibration Utility to calibrate your DVI monitor for video.

Overview

The Matrox DVI Calibration Utility is a unique tool designed to calibrate your DVI monitor so that it performs like a traditional broadcast video monitor when working in Mastering mode (see "Matrox MXO operation modes" on page 3). This utility provides a wizard that walks you through the calibration process using specially designed patterns to effectively identify and compensate for the processing errors that may be present in your DVI monitor. The Matrox DVI Calibration Utility calibrates your monitor's black and white levels, white point, gamma response, and hue and chroma.

Important To use the Matrox DVI Calibration Utility, your DVI monitor must support a display resolution of at least 1280×720.

This utility is optimized for calibrating DVI monitors that display the DVI output from MXO at its exact resolution without any scaling. If the DVI output is scaled by your monitor, a blue-only filter will be required to calibrate your monitor's color (hue and chroma). In this case, you must use a third-party blue-only filter (for example, a blue gel filter, or blue-only calibration glasses) that completely blocks out all colors except for blue.

Note This utility is best viewed at a display resolution of 1280×800 or higher.

Calibrating your secondary display (DVI monitor)

The Matrox DVI Calibration Utility provides on-screen instructions to calibrate your secondary display (DVI monitor). At the end of the calibration process, you must save your calibration settings to a file. Once saved, the calibration settings are automatically loaded as your system's current calibration settings. If you're calibrating more than one DVI monitor, you can calibrate and save settings for each monitor and load the corresponding settings at any time (see "Loading Matrox DVI calibration settings" on page 31). You can later choose to enable or disable the loaded calibration settings (see "Enabling and disabling the Matrox DVI calibration settings" on page 32).

Note To use the Matrox DVI Calibration Utility, your DVI monitor must support a display resolution of at least 1280×720. When the Matrox DVI Calibration Utility is running, you will not have access to the MXO options in the MXO preferences window, and the MXO outputs will not be available to any other application.

1. Ensure that your DVI monitor is connected to MXO's DVI output, turn the DVI monitor on, and allow it to warm up for about 20 or 30 minutes.
2. From the **Apple** menu, click **System Preferences**, and then click the **Matrox MXO** icon.

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3 Click **Mastering**.

4 Under **DVI Monitor (Secondary Display)**, select **DVI monitor calibration**, click **Calibrate**, and follow the on-screen instructions to calibrate your DVI monitor.

5 When prompted at the end of the calibration process, save your calibration settings to a file anywhere on your system. Once saved, your settings are automatically loaded as your system's current calibration settings. You can later choose to enable or disable the loaded calibration settings (see "Enabling and disabling the Matrox DVI calibration settings" on page 32).

Note The calibration settings file is saved as a *.plist* file. If you cancel the DVI calibration, or close the utility at any time before saving the calibration settings, the current calibration settings will be lost.

Loading Matrox DVI calibration settings

After calibrating your DVI monitor and saving your calibration settings to a file (see "Calibrating your secondary display (DVI monitor)" on page 30), the calibration settings are automatically loaded as the current DVI calibration settings for your system. You can, however, load another DVI calibration settings file at any time, but only one calibration settings file can be loaded for your system at any given time. Once loaded, you can enable or disable the calibration settings (see "Enabling and disabling the Matrox DVI calibration settings" on page 32).

Note If your system has multiple users, the loaded calibration settings apply to all users.

1 From the **Apple** menu, click **System Preferences**, and then click the **Matrox MXO** icon.

2 Click **Mastering**.

3 Under **DVI Monitor (Secondary Display)**, select **DVI monitor calibration**, and then click **Calibrate**.

4 In the Matrox DVI Calibration Utility, click **Load Settings** from the **Welcome** page.

5 Select the desired *.plist* calibration file, and then click **Open**.

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Enabling and disabling the Matrox DVI calibration settings

The DVI calibration settings that are loaded for your system (see “Loading Matrox DVI calibration settings” on page 31) can be enabled or disabled. When enabled, the video that is output from the MXO DVI output will have the color settings that are saved in the currently loaded calibration file. This is used when you want to monitor video on your DVI monitor. Disable the calibration settings if you want the DVI video to be output from MXO with its native color settings.

1. From the **Apple** menu, click **System Preferences**, and then click the **Matrox MXO** icon.
2. Click **Mastering**.
3. Under **DVI Monitor (Secondary Display)**, select or clear the **DVI monitor calibration** option to enable or disable the loaded DVI calibration settings.

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5

Using Matrox MXO with Final Cut Pro and Other Supported Programs

This chapter explains how to define various settings for using your MXO with Final Cut Pro and other supported programs.

Matrox MXO project presets for Final Cut Pro

The Matrox MXO QuickTime video output component for Final Cut Pro includes predefined project presets that you can load to immediately apply appropriate MXO settings. You can also create a custom Matrox MXO project preset for Final Cut Pro.

Loading a Matrox MXO project preset

1. Start Final Cut Pro and choose **Final Cut Pro > EasySetup**.
2. From the drop down menu in the **Easy Setup** dialog box, select the preset that matches the format of your project. For example, if you are working with NTSC material, select **Matrox MXO Uncompressed 8-bit NTSC**.
3. Click **Setup** to apply the settings.

Creating a Matrox MXO project preset

1. Start Final Cut Pro and choose **Final Cut Pro > Audio/Video Settings**.
2. In the **Audio/Video Settings** window, select the settings for your new MXO project preset.

Important To be compatible with Matrox MXO, the preset must have 24-bit 48 kHz audio, and an **MXO** setting for both **Video Playback** and **Audio Playback**. The output settings must match your project's sequence settings.

3. In the **Summary** pane, click **Create Easy Setup**.
4. Type a **Name** and **Description**, and then click **Create**.
5. In the **Save** dialog, save the new preset to a location on your computer.

Note By default, the path is set to *\Library\Application Support\Final Cut Pro System Support\Custom Settings*. If you save your preset somewhere else on your computer, the preset will not appear in the Easy Setup list, and may be lost if MXO is re-installed.

Specifying your video and audio output device settings

The following sections explain how to specify your video and audio output device settings for Final Cut Pro, and Adobe After Effects. Many programs share similar output device settings as Adobe After Effects, however, you should refer to your program's documentation for more details.

Important Depending on the application you are using, the MXO video output settings that are available may vary. In most cases, both YUV and RGB settings will be listed. Video editing applications such as Final Cut Pro, Soundtrack Pro, and Motion 2, typically process color using the YUV color space. Therefore, for best results when using these programs you should choose an MXO YUV output

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setting. When using compositing and animation applications such as Adobe After Effects and Autodesk Combustion, you should choose an MXO RGB output setting as these programs process in RGB color space. If you're not sure whether your application or project uses the YUV or RGB color space, try selecting both the MXO YUV and RGB output settings to see which one offers the best performance.

Specifying settings for Final Cut Pro

1. Start Final Cut Pro and choose **View > Video Playback**.
2. Select the MXO setting that matches your project's sequence setting. For example, if you're working with an NTSC project, select **MXO NTSC – YUV (720×486)**. Once you've selected an MXO setting from the video playback menu, **MXO Audio** will be automatically enabled in the **Audio Playback** menu.
3. Ensure that Mastering mode is enabled by choosing **View > External Video > All Frames**.

Remarks

- The **MXO Audio** setting will not work unless you have an MXO setting selected from the **Video Playback** menu.
- If the **External Video** option is off in the **Video Playback** menu, you will not be able to monitor your audio through Matrox MXO. In order to hear your audio, you must choose a device other than **MXO Audio** from the **Audio Playback** menu.

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Specifying settings for Adobe After Effects

1 Start Adobe After Effects and choose **After Effects > Preferences > Video Preview**.

2 From the **Output Device** menu, select **MXO Video Output**.

3 From the **Output Mode** menu, select the setting that matches the format of your project. For example, if you're working with an NTSC project, select **MXO NTSC – RGB**.

4 Click **OK** to save your settings.

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Ensuring accurate printing to tape using Final Cut Pro

In order to perform an accurate print-to-tape using Final Cut Pro with Matrox MXO, you may need to adjust the **Playback Offset** value in the **Device Control Preset Editor**.

To adjust the Playback Offset value:

1. Start Final Cut Pro and choose **Final Cut Pro > Audio/Video Settings**, and then click the **Device Control Presets** tab.
2. Select the preset for your device, click **Edit** or **Duplicate**, and then click **OK**.
3. You can now adjust the value in the **Playback Offset** box.

Note To avoid having black frames recorded at the end of an insert edit, make sure that **Editing** (instead of **Mastering**) is selected in the **Edit to Tape** window. To do this, choose **File > Edit to Tape**, and then select **Editing** from the pop-up menu at the top of the window.

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A

DVI Monitor Scaling Capabilities with Matrox MXO

This appendix provides a breakdown of the scaling capabilities for MXO on various DVI monitors.

Supported DVI monitor scaling settings

The following table shows how your video or desktop is displayed in Mastering and Presentation modes when MXO's **Scale to fit** option is enabled or disabled, depending on your DVI monitor's native resolution.

Note A DVI (flat-panel) monitor's native resolution refers to its maximum resolution.

Legend	
Scaled	The video in Mastering mode, or the desktop in Presentation mode, is scaled to fit the DVI monitor's native resolution.
True (1:1)	The video in Mastering mode, or the desktop in Presentation mode, is displayed at its true resolution (1:1 pixel ratio).
Black	The desktop in Presentation mode is black.

	Scale to fit option	
	Enabled	**Disabled**
1920×1200 DVI monitor (native resolution)		
Mastering mode (video output standard)		
NTSC (720×486i)	Scaled	True (1:1)
PAL (720×576i)	Scaled	True (1:1)
1280×720p	Scaled	True (1:1)
1920×1080i/PsF	True (1:1)	True (1:1)
Presentation mode (desktop resolution)		
640×480	Scaled	True (1:1)
640×480 (stretched)[a]	Scaled	Black
800×500	Scaled	Black
800×600	Scaled	True (1:1)
800×600 (stretched)	Scaled	Black
960×600	Scaled	Black
1024×640	Scaled	Black
1024×768	Scaled	True (1:1)
1024×768 (stretched)	Scaled	Black

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	Scale to fit option	
	Enabled	**Disabled**
1280×720	Scaled	True (1:1)
1280×800	Scaled	Black
1280×960	Scaled	Black
1280×960 (stretched)	Scaled	Black
1280×1024	Scaled	True (1:1)
1344×840	Scaled	Black
1344×1008	Scaled	Black
1600×1000	Scaled	Black
1600×1200	True (1:1)	True (1:1)
1920×1080	True (1:1)	True (1:1)
1920×1200	True (1:1)	True (1:1)
1680×1050 DVI monitor (native resolution)		
Mastering mode (video output standard)		
NTSC (720×486i)	Scaled	True (1:1)
PAL (720×576i)	Scaled	True (1:1)
1280×720p	Scaled	True (1:1)
1920×1080i/PsF	Scaled	Scaled
Presentation mode (desktop resolution)		
640×480	Scaled	True (1:1)
640×480 (stretched)[a]	Scaled	Black
800×500	Scaled	Black
800×600	Scaled	True (1:1)
800×600 (stretched)	Scaled	Black
960×600	Scaled	Black
1024×640	Scaled	Black
1024×768	Scaled	True (1:1)
1024×768 (stretched)	Scaled	Black
1280×720	Scaled	True (1:1)
1280×800	Scaled	Black

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	Scale to fit option	
	Enabled	**Disabled**
1280×960	Scaled	Black
1280×960 (stretched)	Scaled	Black
1280×1024	Scaled	True (1:1)
1344×840	Scaled	Black
1344×1008	Scaled	Black
1600×1000	Scaled	Black
1600×1200	Scaled	Black
1680×1050	True (1:1)	True (1:1)
1920×1080	Scaled	Black
1920×1200	Scaled	Black
1600×1200 DVI monitor (native resolution)		
Mastering mode (video output standard)		
NTSC (720×486i)	Scaled	True (1:1)
PAL (720×576i)	Scaled	True (1:1)
1280×720p	Scaled	True (1:1)
1920×1080i/PsF	Scaled	Scaled
Presentation mode (desktop resolution)		
640×480	Scaled	True (1:1)
640×480 (stretched)[a]	Scaled	Black
800×500	Black	Black
800×600	Scaled	True (1:1)
800×600 (stretched)	Scaled	Black
960×600	Black	Black
1024×640	Black	Black
1024×768	Scaled	True (1:1)
1024×768 (stretched)	Scaled	Black
1280×720	Scaled	True (1:1)
1280×800	Black	Black
1280×960	Black	Black

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	Scale to fit option	
	Enabled	**Disabled**
1280×960 (stretched)	Scaled	Black
1280×1024	Scaled	True (1:1)
1344×840	Black	Black
1344×1008	Black	Black
1600×1000	Black	Black
1600×1200	True (1:1)	True (1:1)
1920×1080	Black	Black
1920×1200	Black	Black
1280×1024 DVI monitor (native resolution)		
Mastering mode (video output standard)		
NTSC (720×486i)	Scaled	True (1:1)
PAL (720×576i)	Scaled	True (1:1)
1280×720p	True (1:1)	True (1:1)
1920×1080i/PsF	Scaled	Scaled
Presentation mode (desktop resolution)		
640×480	Scaled	True (1:1)
640×480 (stretched)[a]	Scaled	Black
800×500	Black	Black
800×600	Scaled	True (1:1)
800×600 (stretched)	Scaled	Black
960×600	Black	Black
1024×640	Black	Black
1024×768	Scaled	True (1:1)
1024×768 (stretched)	Scaled	Black
1280×720	True (1:1)	True (1:1)
1280×800	Black	Black
1280×960	Black	Black
1280×960 (stretched)	True (1:1)	Black
1280×1024	True (1:1)	True (1:1)

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	Scale to fit option	
	Enabled	Disabled
1344×840	Black	Black
1344×1008	Black	Black
1600×1000	Black	Black
1600×1200	Black	Black
1920×1080	Black	Black
1920×1200	Black	Black

[a] In Presentation mode, the video output will be black if you choose to output the desktop as HD video.

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B

Matrox MXO Specifications

This appendix provides specifications for your Matrox MXO box.

Matrox MXO specifications

General

Video standards NTSC, PAL, NTSC-EIAJ, 720p, 1080i/PsF

Regulatory compliance FCC Class A, CE Mark Class A, C-Tick Mark, VCCI RoHS Directive 2002/95/EC

Dimensions L 151mm × W 161mm × H 46 mm (5.94" × 6.34" × 1.81")

Operating voltages External AC/DC adapter: 100-240 V AC 50-60 Hz (5 V DC, 3 A max.)
MXO unit: +5V DC, 3A max., 2.5mm barrel type connector

Total power consumption 10 watts

Connections

DVI input and output DVI-I (single-link) 29-pin port

Genlock reference input SD analog black burst (bi-level) or HD tri-level sync
BNC connector (75 ∧), terminated

SDTV SDI output SD-SDI with 8 channels of embedded SDI audio 24-bit, 48 kHz
BNC connector (75∧)
Compliant with SMPTE 259M-C, SMPTE 272M

SDTV S-Video & composite video output PAL, NTSC, NTSC-EIAJ
Frequency response: +/- 0.25 dB max to 5 MHz
2T pulse response: 0.5% max
Diff. Gain and Diff. Phase: < 2%
BNC connectors (75∧)

SDTV analog component video output Betacam, Betacam SP (NTSC & NTSC-EIAJ)
SMPTE/EBU N10 (PAL)
Frequency response Y: +/- 0.25 dB max to 5 MHz
Frequency response Pb, Pr: +/-0.2 dB max to 2 MHz
Component channel delay: +/- 3ns
Component S/N (Y, Pb, Pr): > 54 dB, unified weighted
BNC connectors (75 ∧)

HDTV SDI output HD-SDI with 8 channels of embedded SDI audio 24-bit, 48 kHz
Compliant with SMPTE 292M, SMPTE 299M
BNC connector (75∧)

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HDTV analog component video output 720p, 1080i/PsF
Compliant with EIA-770.3
Frequency response Y: +/- 0.3 dB max to 28 MHz
Frequency response Pb, Pr: +/-0.4 dB max to 14 MHz
Component channel delay: +/- 0.5ns
Component S/N (Y, Pb, Pr): > 57 dB, unified weighted
BNC connectors (75∧)

Analog stereo line out Left and right RCA connectors
4.35 Vp-p (+6 dBu) maximum output level

Analog stereo loop through Output: Stereo 3.5mm female jack on MXO cable
Input: Stereo 3.5mm male plug on MXO cable
4.35 Vp-p (+6 dBu) maximum input/output levels

Other USB 2.0 type B port
2.5mm DC power jack

Environmental specifications

- Minimum/maximum ambient operating temperatures: 0 to 45º C
- Minimum/maximum storage temperature: –40 to 75º C
- Maximum altitude for operation: 3,000 meters
- Maximum altitude for transport: 12,000 meters
- Operating humidity: 20 to 80% relative humidity (non-condensing)
- Storage humidity: 5 to 95% relative humidity (non-condensing)

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Your notes

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C

Matrox MXO Customer Support

This appendix explains how you can register your Matrox MXO and obtain customer support.

How to get Matrox MXO Customer Support

If you have a problem that you're unable to solve by referring to your Matrox MXO documentation, please contact your Matrox MXO representative. He or she should be able to help you quickly correct any installation or system configuration problem.

If your representative is unable to solve your problem, contact Matrox for further information and assistance.

Registration

You can register your Matrox MXO in the Matrox MXO Support section of our website at www.matrox.com/video/support.

Important Only registered users are entitled to customer support, software updates, special promotional offers, and access to our MXO user forum at http://forum.matrox.com/mxo/.

Keep up to date with our website

In addition to registering your Matrox MXO, our website offers you up-to-the-minute information about Matrox products, software updates, and access to our support databases. Be sure to place our site in your favorites or bookmarks: www.matrox.com/video/support.

Contacting us

Matrox is proud to offer worldwide customer support. Please use the Matrox MXO contact information for your area as provided on our website at www.matrox.com/video/support.

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Compliance Statements

USA

FCC Compliance Statement

Remark for the Matrox hardware products supported by this guide

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or modifications to this unit not expressly approved by the party responsible for the compliance could void the user's authority to operate this equipment. The use of shielded cables for connection of the equipment and other peripherals is required to meet FCC requirements.

Canada

(English) Industry Canada Compliance Statement

Remark for the Matrox hardware products supported by this guide

These digital devices do not exceed the Class A limits for radio noise emission from digital devices set out in the Radio Interference Regulation of Industry Canada.

(Français) Conformité avec les exigences de l'Industrie Canada

Remarque sur les produits matériels Matrox couverts par ce guide

Ces appareils numériques n'émettent aucun bruit radioélectrique dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par Industrie Canada.

Europe

CE

(English) European user's information – Declaration of Conformity

Remark for the Matrox hardware products supported by this guide

These devices comply with EC Directive 89/336/EEC for a Class A digital device. They have been tested and found to comply with EN55022/CISPR22 and EN55024/CISPR24. In a domestic environment these products may cause radio interference in which case the user may be required to take adequate measures.To meet EC requirements, shielded cables must be used to connect the equipment and other peripherals.

(Français) Informations aux utilisateurs Européens – Déclaration de conformité

Remarque sur les produits matériels Matrox couverts par ce guide

Ces unités sont conformes à la directive communautaire 89/336/EEC pour les unités numériques de classe A. Les tests effectués ont prouvé qu'elles sont conformes aux normes EN55022/CISPR22 et EN55024/CISPR24. Le fonctionnement de ces produits dans un environnement résidentiel peut causer des interférences radio, dans ce cas l'utilisateur peut être amené à prendre les mesures appropriées. Pour respecter les impératifs communautaires, les câbles de connexion entre l'équipement et ses périphériques doivent être blindés.

(Deutsch) Information für europäische Anwender – Konformitätserklärung

Anmerkung für die Matrox Hardware-Produktunterstützung durch dieses Handbuch

Diese Geräte entsprechen EC Direktive 89/336/EEC für ein digitales Gerät Klasse A. Sie wurden getestet und entsprechen demnach EN55022/CISPR22 und EN55024/CISPR24. In einer Wohnumgebung können diese Produkte Funkinterferenzen erzeugen, und der Benutzer kann genötigt sein, entsprechende Maßnahmen zu ergreifen. Um EG-Anforderungen zu entsprechen, müssen zum Anschließen des ausrüstung und anderer Peripheriegeräte abgeschirmte Kabel verwendet werden.

(Italiano) Informazioni per gli utenti europei – Dichiarazione di conformità

Nota per i prodotti hardware Matrox supportati da questa guida

Questi dispositivi sono conformi alla direttiva CEE 89/336/EEC relativamente ai dispositivi digitali di Classe A. Sono stati provati e sono risultati conformi alle norme EN55022/CISPR22 e EN55024/CISPR24. In un ambiente domestico, questi prodotti possono causare radiointerferenze, nel qual caso all'utente potrebbe venire richiesto di prendere le misure adeguate. Per soddisfare i requisiti CEE, l'apparecchiatura e le altre periferiche vanno collegati con cavi schermati.

(Español) Información para usuarios europeos – Declaración de conformidad

Observación referente a los productos de hardware de Matrox apoyados por este manual

Estos dispositivos cumplen con la directiva de la CE 89/336/EEC para dispositivos digitales de Clase A. Dichos dispositivos han sido sometidos a prueba y se ha comprobado que cumplen con las normas EN55022/CISPR22 y EN55024/CISPR24. En entornos residenciales, estos productos pueden causar interferencias en las comunicaciones por radio; en tal caso el usuario deberá adoptar las medidas adecuadas. Para satisfacer las disposiciones de la CE, deberán utilizarse cables apantallados para conectar el equipo y demás periféricos.

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www.matrox.com/video